**Name of Work:** Work of supply, testing & implementation of portable clamp on type ultrasonic bulk flow meter for measuring the volumetric flow of water in transmission (pumping delivery and manifold) mains of diameter 600mm to 1500mm and 80mm to 300mm pipe lines in CWSS 4th stage phase I & phase II pump houses at Harohalli & Tataguni. the detailed specification of flow meter is:

Specification of Equipment/Portable Flow meter/Accessories are as follows

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|---|---|
| Measurable Media | : All acoustically conductive liquids water. |
| Type | : Portable Meter |
| Flow Measurement | : The transmitter allows for bi-directional flow measurements to detect and meter back-flow |
| Fluid | : Liquid |
| Area Classification | : Safe |
| Single Channel/Dual Channel meter | : Dual Channel meter |
| Measurement Principle | : Transit time difference correlation principle |
| No of Microprocessor | : 2 No's of Microprocessor |
| Signal Processing Speed | : 1000 Signal per second |
| Measurement Parameters | : Volumetric flow, mass flow rate and flow velocity can be measured. |
| Communication Protocols | : RS232 and USB adapter |
| Flow Velocity Range | : 0.01 to 25 m/s |
| Measurement Accuracy of measuring system | : ±0.3% of reading ±0.005m/s |
| Measurement Accuracy at measuring point | : ±1% of reading ±0.005 m/s, depending on Application |
| Repeatability | : 0.15% of reading ± 0,01 m/s |
| Pipe diameter | : (6 mm to 6500mm) for Liquid |
| pipe Material | : carbon steel, duplex steel, gfk, plastics, steel glass, cement Lined |
| Weight | : 2.1 Kg |
| Transmitter Temperature range | : -10°C to 60°C |
| Transmitter Data Storage | : > 100,000 measured values; all Physical quantities, totalized values and diagnostics values |
| Transmitter protection | : IP65 according to IEC/EN 60529 NEMA 4x |
| Display/Interface | : 2x16 characters, dot matrix, backlight |
| Number of Outputs | : NA |
| Physical Quantities | : Operating Volumetric Flow rate, Mass flow rate, Flow velocity |
| Totalizer | : Volume, Mass |
| Pipe Material | : Flow meter is suitable for metal pipe with cement lining & cement coating and also cement pipes |
| Diagnostics | : Flux data Sound speed, signal amplitude, signal-Noise-ratio (SNR), Signal-Correlated-Noise-ratio (SCNR), standard deviation of amplitudes and transit times. |
| Transducer Materials | : PEEK with stainless steel cover 304 (1.4301) for K-shearwave & G shearwave transducer |
| Transducer Qty | : 2 No's |
| Transducer frequency | : 0.5 MHz shearwave (for Pipe size 200 to 2000mm)<br>0.2 MHz shearwave (for pipe size 500 to 4000mm) |
| Transducer cable length | : 9 mtr |
| Degree of protection | : IP67 |
| Transducer Temp. compensation | : The transducers have integrated temperature sensors for temperature compensation (according to ANSI/ASME MFC-5.1-2011 regulations) to prevent measurement drift due to temperature changes caused by close by heating or cooling piping, boilers or sunlight. |
| Transducer Temperature Range | : (-40°C to ~ 130°C) |
| Transducer cable | : Transducer cable made of PTFE with stainless steel sheath for mechanical robustness. cables are permanently connected to the transducer. |
| portable: Battery run time | : up to 25h runtime |
| Features | : Automatic disturbance correction facility for non-availability of straight run at site |
| Mounting hardware | : The mounting is fixed on the pipe with spring loaded chains. |
| Calibration | : Every transducer and transmitter is factory calibrated and supplied with individual calibration certificates. Calibration is traceable to national standards. calibration data is stored lossless on a sensprom (eeprom) which allows plug and play functionality. |